

Section K - Submission Requirements and Design Criteria Checklist**K1 PLANS OF SUBDIVISION AND SITE PLANS****K1.1 Submissions to External Agencies**

- The Regional Municipality of York
- Toronto and Region Conservation Authority (TRCA), MNR/DFO
- Ministry of Environment (MOE)
- Ministry of Transportation (MTO)
- Ministry of Culture (MOC)
- Hydro One, PowerStream, all utilities
- CNR/GO Transit
- Abutting local Municipalities
- Region of York School Boards

In order to receive approvals of any works that would fall within their jurisdiction, the Consulting Engineer shall deal directly with the external agencies.

K1.2 Draft Plan Acceptance Reports

The following reports are required to be submitted, where applicable, in support of Draft Plan of Subdivision applications for review by the City prior to submission of any detailed engineering submissions:

- Functional Servicing Report (FSR)
- Preliminary Noise Study
- Traffic Impact Study (TIS)
- Functional Traffic Design Study (FTDS)
- Environmental Site Assessment (ESA) Report Phase 1
- Geotechnical/Soil Report

K1.3 Engineering Submission

Refer to the Engineering Submission Required Documents included as ANNEX 1 for details.

K1.4 Construction Preparation

- Engineering Drawings signed by the Director of Engineering.
- Provide Letter of Credit, Engineering Fees and Liability Insurance etc. in accordance with City's requirements
- Dust Control Plan
- All other agencies permits/approvals
- Executed Pre-servicing or Subdivision Agreement/Construction Agreement
- Pre-construction Meeting

Section K - Submission Requirements and Design Criteria Checklist

K2 DESIGN CRITERIA CHECKLIST

The following Design Criteria Checklist shall be submitted with each Engineering Submission. The Consulting Engineer shall indicate by checkmark if the criteria have been followed, or alternatively, any deviations with reasons.

Job Name: _____ Date: _____

Consulting Engineer: _____ Eng. File # _____

Amanda Number: _____ 19TM _____

Design Criteria Checklist

GENERAL REQUIREMENTS			
SECTION 'A'		CRITERIA	CHECKMARK
	<u>Standard Easement Requirements</u>		
	Single sewer/watermain < 3.7 m deep	6.0 m	
	Single sewer/watermain > 3.7 m deep	9.0 m	
	A combination of two pipes < 3.7 m deep	9.0 m	
	A combination of two pipes > 3.7 m deep	Per Detailed Section	
	Three or more pipes	9.0 m (2 pipes) + 3.0 m for each additional pipe	

ROADS			
SECTION 'B'	Minimum Lanes Width		
		for Through Lanes	3.5 m
		for Turning Lanes	3.0 m
		with Shared Bike routes	4.5 m
		for Fire routes	6.0 m
		for Local roads	8.5 m
	Minimum Boulevard Width		
		for Local Road	5.0 m
		for Lanes	1.5 m
	Minimum Longitudinal Grade		0.7%
Maximum Longitudinal Grade		6.0%	
Minimum Cross Fall		2.0%	
Minimum/Maximum Boulevard Grade		2.0%/5.0%	
Minimum/Maximum Driveway Grade		2.0%/8.0%	
Minimum length of grade changes for up to 1.5%		6.0 m for local 10.0 m for collector	

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SECTION 'B'	ROADS (CONT.....)	CRITERIA	CHECKMARK
	Vertical Curve Criteria	As per TAC	
	Vertical curve required for gradient change > 1.5%	Y	
	Minimum Gutter Grade (except bulb or turning circle)	0.7%	
	Minimum Gutter Grade at Bulb or Turning Circle	1.0%	
	<u>Minimum Rounding/Day Light Triangle Requirement</u> Laneway to All Local Road to All Minor Collectors to Minor/Major Collectors Major Collector to Major Collector All City's Road/Laneways to Regional Roads	3.0 m rounding 5.0 m rounding 10.0 m x 10.0 m 15.0 m x 15.0 m As per the Region	
	<u>Minimum Curb Radius at Intersections:</u> Laneway to All Laneway designed as Fire Route Local/Collector Road to All Others including Commercial/Industrial/Institutional	6.0 m 7.0 m 7.5 m 15.0 m (or as per Traffic Study)	
	Minimum Clearance of curb cuts/driveways from all Street Furniture	1.2 m	
	Minimum Clearance of driveway edge and water box	0.3 m	
	Minimum distance of driveway from an intersection	9.0 m	
	Driveway Intersection with the City's Road	90 degrees	
	Grades to be shown every 25 m on Plan & Profile	Y	
	Grades to be shown every 25 m on Grading drawing	Y	
	Saw tothing of road profiles (special permission ONLY)	Not Permitted	
	Curb Type (General)	OPSD 600.070	
	<u>Local Road</u> Depth of HL-3 Depth of HL-8 (1 lift) Depth of 20 mm CRLS or Granular 'A' base Depth of 50 mm CRLS sub-base Depth of Granular 'B' sub-base (if specified as an alternate for 50 mm CLRS sub-base)	40 mm 75 mm 150 mm 300 mm Per Geotechnical Report	
	<u>Collector and Industrial Road</u> Depth of HL-3 Depth of HL-8 (2 lifts) Depth of 20 mm CRLS or Granular 'A' base Depth of 50 mm CRLS sub-base Depth of Granular 'B' sub-base (if specified as an alternate for 50 mm CLRS sub-base)	50 mm 100 mm 150 mm 450 mm Per Geotechnical Report	

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		WATERMAINS & APPURTENANCES		
			CRITERIA	CHECKMARK
SECTION 'C'	Design of Water Distribution System		Hazen Williams Eq.	
	Average Daily Demand (ADD) (Residential)		365 l/c/d	
	Peak Daily Demand (2 times ADD)		730 l/c/d	
	Peak Hourly Demand (4.5 times ADD)		1,643 l/c/d	
	Minimum Hourly Demand (0.7 times ADD)		256 l/c/d	
	<u>Fire Flow</u>			
		Minimum Residential Non-Residential	7,000 l/min. Per 'Underwriters'	
	Commercial and Institutional Flow		based on individual review	
	<u>Pipe Roughness</u>			
		150 mm pipe	100	
		200 – 250 mm pipe	110	
		300 – 600 mm pipe	120	
		Over 600 mm pipe	130	
	Minimum Static Pressure During Peak Hourly Demand		300 KPa	
	Maximum Static Pressure During Peak Hourly Demand		650 KPa	
	Where Maximum Static Pressure Exceeds 550 KPa, Pressure Reducing Valve shall be provided		Y	
	Minimum Fire Flow Pressure During Peak Daily		140 KPa	
	Preferred side of the street (or side with most service connections)		North and East	
	Offset from Property Line (per Engineering Standards)		Y	
	<u>Watermain Covers</u>			
	Minimum	1.75 m		
	Minimum with Frost Protection	1.20 m		
	Maximum	2.25 m		
<u>Watermain Clearances with Sewers (as per MOE)</u>				
	Vertical	0.5 m		
	Horizontal	2.5 m		
<u>Maximum Hydrant Spacing</u>				
	Single Residential	120* m		
	Townhouses/Industrial/Commercial/Institutional	90* m		
	<i>*or maximum hose length of 75.0 m whichever is more stringent</i>			
Valves required at Hydrants (Y/N)		Y		
Hydrants off-set from Driveways		1.2 m		
Pipe Material		PVC Class 150, DR-18 to AWWA C-900		
<u>Minimum Pipe Size</u>				
	Residential Developments	150 mm		
	Industrial/Commercial Developments	300 mm		
<u>Numbers of Valves Required</u>				
	at a Cross-Intersection	3		
	at a Tee-Intersection	2		

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SECTION 'C'	Watermain & Appearances (CONT.....)	CRITERIA	CHECKMARK
	Maximum Valve Spacing	300 m or Maximum 40 Connections	
	Valve chambers required for 150 mm & larger pipe	Y	
	Drain to storm sewer or stone trench required in valve chamber	Y	
	Cathodic protection requirements from municipality or geotechnical report	As required by criteria	
	Bedding Type and Standard	Std.MW-13 for PVC (min) or as specified	
	Flushing Stations at Dead Ends	Y	
	Hydrants on either end of Laneways	Y	

SANITARY SEWERS			
SECTION 'D'		CRITERIA	CHECKMARK
	Maximum Harmon Peaking Factor	4.0	
	Minimum Harmon Peaking Factor	1.5	
	Design Flow = Peak Flow + Infiltration	Y	
	<u>Residential Population Densities (people/unit)</u>		
	Singles/Semis/Duplex	4.0 people/unit	
	Townhouses	3.8 people/unit	
	Apartments	3.0 people/unit	
	<u>Residential Population Densities (people/ ha gross area)</u>		
	Singles/Semis/Duplex	70 people/ha	
	Townhouses	175 people/ha	
	Apartments	475 people/ha	
	<u>Non-Residential Population Densities (people/ha gross area)</u>		
	Schools & Institution	60 people/ha	
	Light industrial (no major office component)	70 people/ha	
	Offices	150 people/ha	
	Commercial (retail)	100 people/ha	
	Heavy Industrial (shall be based on first principles)	(gross floor area) or 95 people/ha	
Hotels/Motels	0.5 people/bed		
Hospitals	4 people/bed		
Parks and Recreation	60 people/ha		
Commercial/Industrial/Schools/Institutions flow (including infiltration and peaking factor)	180,000 l/ha/day		
Average Daily Flow (residential)	365 l/c/d		
Average Daily Flow (Employment)	214 l/employee/d		
Infiltration	0.26 l/s/ha		
Peaking Factor (using Harmon Peaking Factor)	Y		
Sewer Capacity (using Manning's Formula)	Y		
Common trench accepted (Y/N) (where appropriate)	Y		
Offset from road centreline (where not in common trench)	1.5 m		
Location within road (preferred on north & east side)	North/East		

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SECTION 'D'	Sanitary Sewers (CONT.....)	CRITERIA	CHECKMARK
	Minimum sanitary sewer size	200 mm	
	<u>Pipe Material</u> Sewers 200 mm to 375 mm Sewer > 375	PVC SDR 35 or Concrete Concrete (Class/Strength)	
	Manning's Roughness Co-efficient	0.013	
	<u>Velocities</u> Minimum velocity (partial full velocity) Minimum velocity (full velocity) Maximum (full velocity)	0.60 m/s 0.75 m/s 3.65 m/s	
	Minimum Sewer Grade (up to 300 mm)	0.5%	
	<u>Grade for First Sewer Leg</u> Minimum Maximum	1.0% 3.0%	
	Change in velocity from one pipe to another in a MH	0.6 m/s (max)	
	Minimum Grade (%) 1st Leg not less than 1.0%	meet minimum velocity	
	Maximum Grade (%)	not to exceed maximum velocity	
	Bedding Type as per OPSD	Y	
	Minimum depth of cover below road centerline	2.75 m	
	Service connection risers required when sewer invert exceeds	4.5 m	
	<u>Sewer Clearances with Watermains</u> Horizontal (per MOE) Vertical	2.5 m 0.5 m	
	Change in Flow Direction in MH shall not exceed 90°	Y	
	Provide Safety Grading with MH depth exceed 5 m	Y	
	Maximum Change in flow direction in MH for sewers 1050 mm and over shall be 45°	Y	
	Maximum MH Drop without drop structure	0.6 m	
	MH benching to (obvert or springline)	obvert	
	Minimum benching width between channel edge and the inside of wall of a MH	250 mm	
Minimum Spacing between MH and curb	1.5 m		
<u>MH Spacing (Maximum)</u> Up to 1050 mm 1200 mm and over Major Trunk	120 m 150 m Case-to-case		
<u>Minimum MH Drop</u> Straight Up to 45° 46° to 90°	0.02 m 0.05 m 0.08 m		
Maximum Deflection of PVC Pipe	7.5%		

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STORM SEWERS			
SECTION 'E		CRITERIA	CHECKMARK
	Storm Sewer Design (shall operate without surcharge for 100-Year storm event)	5-Year	
	Sewer Designed by Rationale Method	Y	
	<u>Runoff Coefficients</u>		
	Asphalt, Concrete, Roof, Gravel and Parking Lots	0.90	
	Grassed Areas, Parkland	0.25	
	Commercial	0.90	
	Industrial	0.90	
	Institutional (Schools and Churches)	0.75	
	Residential – Single Family	0.65	
	Residential – Semi-detached, Duplex	0.70	
	Residential - Row Housing, Townhouses	0.75	
	Residential - Apartments/Mix Used	0.85	
	<u>Return Period Factor</u>		
	Up to 10-Year	1.00	
	25-Year	1.10	
	50-Year	1.20	
	100-Year	1.25	
	Intensity Formula	$I_5 = \frac{1045.41}{(T + 4.9)^{0.83}}$	
	Initial Inlet Time	10 min	
	<u>Analysis Requirements</u>		
	100-Year HGL (basement protection)	0.5 m (minimum)	
	Overland Flow Depths	within ROW	
	Typical offset from centreline of road (when not common trench)	1.5 m	
	Minimum Storm Sewer size	300 mm	
	Minimum FDC size	200 mm	
	Minimum CB lead size	200 mm	
	Minimum DCB lead size	300 mm	
Minimum rear yard CB lead size	250 mm		
<u>Pipe Material</u>			
Sewers 200 mm to 375 mm	PVC SDR 35 or Concrete		
Sewer > 375	Concrete (Class/Strength)		
Manning's Roughness Co-efficient	0.013		
<u>Velocities</u>			
Minimum velocity (partial full velocity)	0.60 m/s		
Minimum velocity (full velocity)	0.75 m/s		
Maximum (full velocity)	3.65 m/s		
Minimum Sewer Grade (up to 300 mm)	0.5%		
<u>Grade for First Sewer Leg</u>			
Minimum	1.0%		
Maximum	3.0%		
Change in velocity from one pipe to another in a MH	0.6 m/s (max)		
Minimum Grade (%) 1st Leg not less than 1.0%	meet minimum velocity		

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SECTION 'E'	Storm Sewers (CONT.....)	CRITERIA	CHECKMARK
	Maximum Grade (%)	not to exceed maximum velocity	
	Bedding Type as per OPSD	Y	
	Minimum depth of cover below road centerline	2.75 m	
	Minimum depth for frost protection	1.2 m	
	Service connection risers required when sewer invert exceeds	4.5 m	
	<u>Sewer Clearances with Watermains</u>		
	Horizontal (per MOE)	2.5 m	
	Vertical	0.5 m	
	Minimum Radius Pipe Diameter	675 mm	
	<u>Minimum MH Drop</u>		
	Straight	0.02 m	
	Up to 45°	0.05 m	
	46° to 90°	0.08 m	
	<u>Maximum MH Spacing</u>		
	Up to 600 mm	120 m	
	675 mm and over	170 m	
	Change in Flow Direction in MH shall not exceed 90°	Y	
	Provide Safety Grading with MH depth exceed 5 m	Y	
	Maximum Change in flow direction in MH for sewers 1050 mm and over shall be 45°	Y	
Maximum MH Drop without drop structure	0.6 m		
MH benching to (obvert or springline)	obvert		
Minimum benching width between channel edge and the inside of wall of a MH	250 mm		
Minimum Spacing between MH and curb	1.5 m		
<u>Maximum Catchbasin Spacing</u>			
Two Lane Road (with grades up to 4.0%)	110 m		
Two Lane Road (with grades 4.0% to 6%)	75 m		
Four Lane Road (with grades up to 4.0%)	60 m		
Four Lane Road (with grades 4.0% to 6%)	45 m		
Inlet Control for Street CB's	Pre-fabricated inlet controls		
Maximum Contribution Area to be Drained by RLCB (lesser of)	0.1 ha or 4 rear yards		
RLCB leads constructed with concrete pipe	Concrete Encased		
RLCB leads constructed with PVC pipe	Concrete Slab		
Minimum RLCB Gradient	0.5%		
Super Catchbasins Designed with 50% Blockage	Y		

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LOT GRADING			
		CRITERIA	CHECKMARK
SECTION 'F'	Minimum Depth of Topsoil on Lots/Boulevards	200 mm	
	Minimum Depth of Topsoil on Designated Tree Planting Trenches	750 mm	
	<u>Yard Slopes</u>		
	Minimum	2.0%	
	Maximum	5.0%	
	<u>Driveway Grades</u>		
	Minimum	2.0%	
	Maximum	8.0%	
	Maximum Grades between Houses in any Direction	3 (H) : 1 (V)	
	Rear Yard Swale can Drain (lesser of)	0.1 ha or 4 Lots	
	<u>Block Gradient (within a Subdivision)</u>		
	Minimum	2.0%	
	Maximum	5.0%	
	<u>Park Gradient (within a Subdivision)</u>		
	Minimum	2.0%	
Maximum	5.0%		
Minimum Topsoil Depth on Park Block	300 mm		
<u>Swale Gradient (longitudinal)</u>			
Minimum	5.0%		
Maximum	2.0%		
<u>Side Yard Swale Depth</u>			
Minimum	150 mm		
Maximum	250 mm		
Maximum Slope Gradient	3 : 1		
Maximum Retaining Wall without Engineer's Seal	0.9 m		
1.5m High Fence Required for Retaining Wall > 1.0m	Y		

COMPOSITE UTILITY PLANS			
		CRITERIA	CHECKMARK
SECTION 'G'	<u>Minimum Clearances</u>		
	Hydro with MH, CB, VC, Hydrant	1.2 m	
	Gas-main with all Underground Structure	300 mm	
	Street Furniture with Driveways	1.2 m	
	Trees from Stop Sign at Intersection	15.0 m	
	Composite Utility Plans signed by all Utilities	Y	

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SECTION 'H'	SITE PLAN GUIDELINES		CRITERIA	CHECKMARK
	Permanent Dewatering not Allowed without Mitigation		Y	
	<u>Boulevard Grades</u>			
		Minimum	2.0%	
		Maximum	4.0%	
	<u>Asphalt Grades</u>			
		Minimum	2.0%	
		Maximum	8.0%	
	Maximum Ramp Grade to UG Garage		15.0%	
	<u>Landscape Area/Berm Grades</u>			
		Minimum	1.0%	
		Maximum	3 (H) : 1 (V)	
	<u>Entrance/Driveway Grades (per OBC Fire Route Requirement)</u>			
		Minimum	2.0%	
		Maximum	8.0%	
	Entrance Curb Radii and Curb Cut		Per By-law 158-93	
	One Service (WM,STM, SAN) Connection per Block		Y	
	Pipe to be Insulated if Cover is less than 1.2 m		Y	
Sewer Design Sheets Required for Site > 1.0 ha		Y		
Finished Floor Elevation to be minimum 300 mm Higher than maximum Ponding Depth		Y		
Minimum Orifice Control Pipe size		100 mm		
ICDs to be Used for Low Flow Control		Y		
<u>Maximum Ponding Depth</u>				
	Parking Area	250 mm		
	Loading Dock	500 mm		
	Roof	150 mm		
Minimum Roof Release Rate		42 l/s/ha		

DRAFTING & DRAWING REQUIREMENTS				
		CRITERIA	CHECKMARK	
SECTION 'J'	Drawing Size (594 mm x 841 mm)		A1 Metric	
	General Plans		1 : 1000	
	Storm/Sanitary Drainage Plans		1 : 1000	
	External Storm/Sanitary Drainage Area Plans (or as appropriate for site but not exceeding 1:5000)		1: 2000	
	Grading Plans		1 : 500	
	Plan & Profiles		1 : 500 (Horizontal) 1 : 100 (Vertical)	
	Site Alteration Plan (or as appropriate for site but not exceeding 1:5000)		1 : 1000	
	Stormwater Management Ponds etc.		1 : 500	
	Composite Utility Plans		1 : 500	
	Pavement Markings & Signage Plans		1 : 500	
	Electrical Design Drawings		1 : 1000	
	Design Sheets		As appropriate	
	Details Sheets		As appropriate	
	Minimum Referenced to City's Benchmark		2 nos.	
	Drawings shall be Signed by P. Eng.		Y	
	City's Facility IDs (SAN/STM MH, Hydrant, Valve and Chamber Provided.		Y	

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EROSION & SEDIMENT AND DUST CONTROL			
SECTION 'L'		CRITERIA	CHECKMARK
	Site Alteration Plans prepared as per the latest TRCA requirements	Y	
	Minimum clearance of toe of stockpiles from a roadway, drainage channel, or residential lot.	10.0 m	
	Maximum side slopes for topsoil stockpiles	1.5 (H) : 1.0 (V)	
	Maximum height of stockpiles	3.0 m	
	Minimum length of mud mats	50.0 m	
	TRCA checklist provided at the end of the report	Y	
	Site Alteration 'General Notes' included in the Site Alteration Plan	Y	
	Clearance from the Ministry of Culture provided	Y	
	ESA clearance provided	Y	

SERVICE CONNECTIONS				
SECTION 'M'		CRITERIA	CHECKMARK	
	Storm Service Connections			
	Diameter for single residential connection	125 mm		
	Diameter for double residential connection	150 mm		
	Minimum diameter for Industrial/Commercial/Inst.	300 mm		
	Minimum grade	2.0%		
	Material	PVC		
	Y-Connections allowed (Y/N)	Y		
	Minimum depth at property line (unless FDC used)	2.50 m		
	Maximum flow depth for Overland Flow	250 mm		
	Sanitary Service Connections			
	Diameter for residential connection	125 mm		
	Minimum diameter for Industrial/Commercial/Inst.	150 mm		
	Material	PVC		
	Y-Connections allowed (Y/N)	N		
	Minimum depth at property line	2.75 m		
	Water Service Connections			
	Service connection not allowed on 450 mm pipe	Y		
	Diameter for residential connection	19 mm single		
	Diameter when connection length from main to building setback exceeds 30 m	25 mm		
	Material	Type 'K' Copper		
	Y-Connections allowed (Y/N)	N		
	Valves permitted in driveways (Y/N)	N		
	Curb-stop offset from property line	At Street Line		

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